

Effluent control for river water quality and pollution management: application of decision support system for ...

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ABSTRACT

Water is the basic for lives. Moreover, water resources are very important for development of nations. But nowadays, water pollutions of different scales happen everywhere as a result of improper effluent control. So, surface water is seriously affected. The management and control of pollution sources before discharged into river are mostly important to maintain water quality. In this study, the innovated concepts of Integrated Pollution Control (IPC) and Total Maximum Daily Loads (TMDLs) are discussed. The Decision Support System for Integrated Pollution Control (DSS/IPC) model is applied to meet the goals of proper river management. Analysis of a study case of water pollution situation in a city was carried out and demonstrated by using DSS/IPC and MapInfo systems. The study identifies and compares major pollution sources for surface water within the study area. The simulated results also show the most serious pollution source, such as textile manufacturing, which needs to be controlled and reduced. Calculation of water pollutants quantity (especially BOD5) discharged into rivers indicates that, half of rivers beyond the legislated standard of BOD5 in study area are identified to be polluted. To reduce BOD5 concentration in polluted rivers to meet legislated standard, the reduction measures of industrial processes must upgrade to secondary treatment. In addition, the results also estimate the total cost for upgrading and the Long Run Marginal Cost (LRMC). The highly BOD5 effluent charge is proposed to encourage factories to reduce quantities of BOD5. Finally, a successful combination between the DSS/IPC and MapInfo, series of pollution maps and database were created for environmental managers, such as background pollution, river pollution, and serious sources pollution maps etc. Those maps will be easier to share and open all the information to concerned public and stakeholders.

Keywords : Effluent control, Water quality, Decision support system for integrated pollution control(DSS/IPC)

Table of Contents

| | | | | | |
|----------------------|-----|--|------|---|----|
| 中文摘要 | iv | Abstract 西文摘要 | vi | Acknowledgements 誌謝辭 | |
| ..... | vii | Contents 目錄 | viii | List of Figures | xi |
| List of Tables | xiv | Chapter 1 Introduction | 1 | 1.1 Water resources and pollutions | 1 |
| ..... | 1 | 1.2 Water quality management models | 5 | 1.3 The objectives of thesis | 8 |
| ..... | 8 | Chapter 2 River Water Quality and Pollution Management | 11 | 2.1 The sustainable use of water | 11 |
| ..... | 11 | 2.2 Management of river water resources | 13 | 2.2.1 Integrated river water resources planning | 16 |
| ..... | 16 | 2.2.3 Institutional arrangements | 17 | 2.2.4 Legal frameworks | 18 |
| ..... | 17 | 2.2.6 Effective technologies | 20 | 2.2.7 Targets and costs | 21 |
| ..... | 21 | 2.3 Total maximum daily load (TMDL) and integrated pollution control (IPC) | 22 | 2.3.1 Total maximum daily load (TMDL) | 22 |
| ..... | 22 | 2.3.2 Integrated pollution control (IPC)..... | 25 | 2.3.3 IPC in Europe | 27 |
| ..... | 27 | 2.4 The legislation of river water quality control | 33 | 2.4.1 Legislation on water quality in Taiwan | 33 |
| ..... | 33 | 2.4.2 Legislation on water quality in the United Kingdoms | 36 | 2.4.3 Legislation on water quality in the United State of America | 39 |
| ..... | 39 | 2.5. The practice of DSS/IPC | 41 | 2.5.1 Decision Support System (DSS) | 41 |
| ..... | 41 | 2.5.2 The practice of the DSS/IPC | 42 | Chapter 3 The DSS/IPC Model | 46 |
| ..... | 46 | 3.1 Fundamentals of the DSS/IPC model | 46 | 3.1.1 Structure of the database | 46 |
| ..... | 46 | 3.1.2 Ambient water concentrations | 47 | 3.1.3 Cost calculation | 51 |
| ..... | 51 | 3.2. Basic functions of DSS/IPC | 52 | 3.2.1 An educational tool | 53 |
| ..... | 53 | 3.2.2 A reference database for pollution management | 54 | 3.2.3 A screening and data management tool | 54 |
| ..... | 54 | 3.2.4 An analytical tool | 56 | 3.2.5 Water pollution control | 56 |
| ..... | 56 | 3.2.6 Analysis of pollution control policies | 57 | 3.3 Advantages of the DSS/IPC | 58 |
| ..... | 58 | 3.3.1 Cost analysis | 58 | 3.3.2 GIS combination | 67 |
| ..... | 67 | 3.4 Comparison between DSS/IPC with Q2K and WASP models | 72 | 3.5 Model accomplishment | 73 |
| ..... | 73 | Chapter 4 Case Study | 77 | 4.1 Scenario of case | 77 |
| ..... | 77 | 4.1.1 Input parameters | 77 | 4.1.2 Socioeconomic conditions | 79 |
| ..... | 79 | 4.1.3 River system | | | |

| | | | | |
|---|-----|--|-----|-------------------------------------|
| ..... | 80 | 4.1.4 Industrial activities | 82 | 4.2 Model simulation |
| ..... | 83 | 4.2.1 Modify health guide lines | 83 | 4.2.2 Input study area information |
| ..... | 83 | 4.2.3 Input production | 84 | 4.2.4 Input river system data |
| 4.2.5 Input data for load contributions to water bodies | 85 | 4.2.6 Calculation | 86 | 4.3 Results and discussions |
| ..... | 88 | 4.3.1 Identify and compare major pollution sources | 88 | 4.3.2 Surface water quality |
| ..... | 91 | 4.3.3 Serious pollution sources | 92 | 4.3.4 Cost analysis |
| 4.3.5 GIS combination | 105 | Chapter 5 Conclusions and Suggestions | 110 | 5.1 |
| Conclusions | 110 | 5.2 Suggestions | 113 | References 參考文獻 |
| | 115 | Appendix 附錄 | 118 | |

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